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A HOLISTIC REVIEW ON *TRIDAX PROCUMBENS*; PHYTOCONSTITUENTS AND PHARMACOLOGICAL ACTIVITIES

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ABSTRACT

India is a country where herbal medicines are found everywhere. The herbal plant we are going to review in this article is also found in the region of Rajasthan (India). Use of herbal ingredients as a medicinal has been noted for a long time. The herbal plants possess a broad spectrum of therapeutic uses. One of the herbal plants is *Tridax procumbens*, which contains anti-diabetic, anti-inflammatory, wound-healing, anti-anemic, and anesthetic properties. The plant belongs to the family of Asteraceae and is commonly known as Dagdi Pala in Maharashtra (India). Using herbal ingredients offers patients affordable and harmless benefits. This article is going to collect the physiological properties, phytochemical constituents, as well as biological behavior of *Tridax procumbens*.

INTRODUCTION

The use of herbal ingredients to cure patient is noted a long time ago, even the ancient health system is comprised of Ayurveda, Siddha and Unani system. Using herbal plant juices, herbal extract are common in this systems. Also, there are many herbal remedies for today's infectious diseases. In recent years, modern health system approaching traditional herbal plant extract in new versions with the novel drug delivery approach. Novel drug delivery system and traditional herbal medicine creates a good combination to cure a modern ailment.[1]

Tridax procumbens, a daisy plant species that is seen all over the world. Generally, in English it is known as Tridax daisy, in Hindi known as Ghamra, Dagdi pala in Marathi and in Tamil it is known by Thata poodu name. This weed is seen on wasteland and near roadsides in India.

Tridax procumbens belongs to Asteraceae family. It have potential to cure the fresh wounds, and in tribal areas it is used as hair tonic (Zambare et al, 2010). As the modern health system grows, the abundant qualities of Tridax are being exposed. The plant contains secondary metabolites like flavonoids, alkaloids, tannins, and saponins, etc.

PLANT PROFILE

Kingdom- Plantae

Sub-kingdom- Tracheobionta

Division- Spermatophyta

Subdivision- Magnoliophyta

Class- Magnoliopsida

Subclass- Asteridae

Order- Asterales

Family- Asteraceae

Genus- Tridax L.

Species- *Tridax procumbens* L.[4]

CHEMICAL PROFILE

The chemical profile of *Tridax procumbens* consists of alkaloids, flavonoids, saponins, carotenoids, etc. To know the quantitative values of these secondary metabolites, a study was conducted in University of Port Harcourt, Nigeria.[5]

Table 1: Proximate content found in leaves of *Tridax procumbens.*

Parameters	Wet Weight	Dry Weight
Moisture (%)	90.051±0.00	-
Total ash (%)	0.21±0.02	2.02±0.21
Crude protein (%)	3.45±0.00	34.56±0.01
Crude lipid (%)	0.61±0.02	6.031±0.21
Crude fiber (%)	0.60±0.04	6.14±0.41
Total carbohydrate (%)	5.11±0.02	51.27±0.21
Total metabolizable energy (kcal/100g)	39.55±0.26	397.58±2.60

*All values are means ± SD of triplicate determinations

Table 2: Mineral Element composition in leaves of *Tridax procumbens* (For mg/kg).

Mineral element	Wet weight	Dry weight
Calcium (Ca)	2.091	20.97
Magnesium (Mg)	0.36	3.57
Potassium (K)	3.19	31.93
Sodium (Na)	5.03	50.45
Selenium (Se)	0.03	0.21

Table 3: Phytochemical Qualitative Profile in leaves of *Tridax procumbens.*

Phytochemicals	Status
Alkaloids	+
Carotenoids	++
Flavonoids	+
Catechin Flavones	+
Saponins	+
Tannins	++
Carbohydrates	+
Glycosides	+
Steroids	+

*Key: + = moderately present; ++ = highly present

Table 4: Phytochemical Qualitative Profile in leaves of *Tridax procumbens* (For mg/100g)

Phytochemical	Dry weight	Wet weight
Carotenoids	94.56	9.42
Saponins	103.53	10.31
Tannins	4.73	0.48

*Values are Means of triplicate determinations

The problems associated with high moisture content is

- Due to high moisture value it shows a short shelf-life.
- Upon moisture removal, the relative constitution of T. procumbens increases.

Upon examination, it is shown that T. procumbens contains high amounts of sodium, potassium, and calcium. The saponin content is found abundantly in TP, these saponins help to decrease the uptake of some nutrients like cholesterol and glucose. It helps to decrease the metabolic load of the liver. It also serves as vitamin A (Carotenoid) source.

ANTI-INFLAMMATORY ACTIVITY & ANALGESIC ACTIVITY

Various studies were carried out to test the anti-inflammatory activity of *Tridax procumbens*. The primary Reactive Oxidative Species (ROS) are implicated in the pathogenesis of inflammatory and different illness in biological system. The presence of alkaloids and flavonoids are able to revert this reaction to achieve anti-inflammatory action (Debolina D., 2022). To study the analgesic effect, moderate pain was caused to male C57 BL6/J mice (25-30g) using Formalin injection, the pain was caused due to tissue and functional changes in dorsal horn of spinal cord. After administration of TP extract the analgesic effect were captured. The abdominal constriction test were carried out using Acetic acid in male C57 BL6/J mice, upon administration of TP extract, relief in abdominal is noted. The mechanical hyper-analgesic test were carried out in Sprague-Dawley male rat (150-230g), upon TP extract administration, significant relief is noted (Shankul Kumar et al., 2012).[4]

ANTI-BACTERIAL ACTIVITY

The antibacterial activity was carried out using *Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella typhi*, *Bacillus cereus*, *Staphylococcus aureus* strains. The utilization of Disc Diffusion method reported. The methanolic extract and ethyl acetate extract were compared with standard antibiotic streptomycin (500µg/disc) (V. Bharathi et al., 2012).[12]

Table 5: Antimicrobial activity by Disc Diffusion method.

Organism	Inhibition zone diameter (cm)		
	Methanolic extract	Ethyl acetate extract	Streptomycin
Staphylococcus aureus	1.51 ± 0.64	1.51 ± 0.74	2.31
Klebsiella pneumoniae	-	0.21 ± 0.54	2.41
Salmonella typhi	-	1.31 ± 0.48	2.11
Escherichia coli	1.11 ± 0.53	0.11 ± 0.36	2.21
Bacillus cereus	-	1.31 ± 0.48	2.01

This study gives a clear antibacterial activity of Tridax procumbens and further used for antibacterial pharmaceutical formulations.

ANTI-HEPATOTOXIC ACTIVITY

Many research studies were carried out to check the hepatoprotective activity of T. procumbens. In 2008, a study is carried out using pharmacological agents that cause the same effects like intoxication of drug, peroxidation of liver, etc. After administration of T. procumbens extract the hepatoprotective activity is noted (Hemalatha, 2008). In 2010, a study was done on liver damage caused by Paracetamol drug, upon administration of TP extract the levels of serum alkaline phosphatase, serum aspartate aminotransferase, etc. gets reduced. The hepatoprotective activity is noted (Wagh and Shinde, 2010). A study was done with D-Galactosamine, upon TP extract injection the hepatoprotective activity is noticed by blocking the transcription process (S. Mundada et al., 2010).

TOTAL PHENOLIC CONTENT

The total phenolic content was checked using Folin-Ciocalteu reagent. The reaction was done at room temperature; and absorbance was taken at 765nm utilizing microplate reader. The phenolic content was found to be 12 mg/g GAE (Gallic Acid Equivalent) (J D Habila, 2010).

WOUND HEALING ACTIVITY

The wound healing process is done in epidermal and dermal region. The extract of *Tridax procumbens* reduces the dexamethasone effect which is present at the time of skin disruption. Dexamethasone delays the wound repairing period known as healing suppressant agent. The TP extract contains lysyl oxidase which helps to repair skin damage. Further increase in protein and nucleic acid content is also reported (S Kumar et al., 2012).

TRADITIONAL USES

- The TP extract is used as anti-inflammatory, anti-bacterial and antiseptic for wound as well as skin damage.
- This extract was used as hair growth promoter from ancient period.
- The extract gives anti-parasitic and anti-leishmanicidal activity against parasite.
- This extract is able to cure ailments like stomach ache, diarrhea and liver disorder.
- It is also used as anti-fungal, anti-malarial and anti-trypanosomal agent.
- In fishery it act as fish growth enhancer.
- The aq. Extract also possesses anti-hypertensive activity and able to slow the heart rate.
- The TP has a wide variety of uses it also seen as repelling agent, insecticidal as well as parasiticidal agent.

- It also utilized as bio-adsorbent in chromium poisoning cases.
- It also serve as defluroidizing agent in water treatment to lower the fluoride content in water.

CONCLUSION

Tridax procumbens contains various phytochemicals which serve a wide range of treatment. Its methanolic extract and ethyl acetate extract both are used to cure different diseases. This article was able to enlist its most uses like anti-bacterial, anti-inflammatory, even its analgesic property. Its utilization in wound healing as a coagulating agent is noted in various reports. The plant extract contains alkaloids, flavonoids, tannins, saponins, as well as carotenoids which helps to cure the disease condition.

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